REMARKS

Applicants thank the Examiner for the thorough consideration given the present application.

Claims 1-29 are pending. Claims 3, 4 and 9-25 are withdrawn. Claims 1, 5, 7 and 9 have been amended to more clearly recite the intended subject matter. Specifically, amended claim 1 finds support in, for instance, page 5:7-10, amended claim 5 in the subject matter recited in original claim 3, and claim 7 in page 6:26-28 of the present specification. Withdrawn claim 9 has been amended to change the dependency on claim 1. Thus, no new mater has been added. Also, the dependency of claim 5 is changed from claim 3 to claim 1. Further, claims 26-29 have been added, which addition is supported by at least the present specification.

The Examiner is respectfully requested to reconsider the pending application

Objection to the Claims

Claim 1 is objected to informalities. By way of the Amendment, this objection has been obviated and moot.

Issues under 35 U.S.C. § 112, second paragraph

The Examiner has rejected claims 1, 2 and 7 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

This rejection is respectfully traversed.

The present claim terms have been clarified. For example, the structure of claim 1 has been clarified such that it is clear that the present biochip includes a chip substrate and gel spots

that are mounted and immobilized thereon. These gel spots have pores therein and biomaterials are entrapped in the pores and encapsulated by the spots. Moreover, the biomaterials have a free orientation without being immobilized.

In claim 7, the term of "cyclic olefin copolymer" is well known compound in the art. As seen from the attachment (an excerpt of Wikipedia), cyclic olefin copolymer is defined and called as ethylene copolymer, COC, cyclo olefin copolymer, cyclic olefin polymer, and ethylene-norbornene copolymer. Applicants have amended the term of "cyclic olefin copolymer" to recite cyclic olefin copolymer (COC). Thus, by way of these amendments, this rejection is believed to be moot.

In view of the above, it is respectfully submitted that the present claims define definite subject matter.

Issues under 35 U.S.C. §§ 102 and 103

The Examiner has rejected claims 1-2 under 35 U.S.C. § 102(b) as being anticipated by Taylor et al. (WO 99/36576). Also, the Examiner has rejected claims 1-2 and 5-6 under 35 U.S.C. § 102(b) as being anticipated by Stengele et al. (US Application Publication No. US 2002/0053508). Further, the Examiner has rejected claims 5-6 as being obvious over Stengele '508 in view of Pfeifer (U.S. Patent No. 4,680,195). Lastly, claims 5 and 7-8 have been rejected under 35 U.S.C. § 103(a) as being obvious over Stengele '508 in view of Simon et al (U.S. Patent No. 5,569,607).

Applicants respectfully traverse these rejections.

While not conceding to the Examiner's rejections, but to merely advance prosecution, independent claim 1 has been amended to further emphasize the distinctions between the present invention and the cited art.

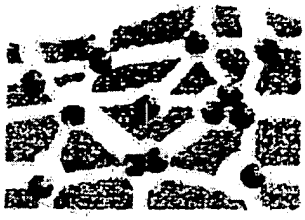
It is respectfully submitted that claim 1 is not anticipated by the prior art cited by the Examiner. As set forth in Section 2131 of the MPEP Original Eighth Edition, August 2001 Latest Revision August, 2007, page 2100-67:

> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. V. Union Oil Co. Of California, 814 F2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).... "The identical invention must be shown in as complete detail as is contained in the ... claims." Richardson v. Suzuki Motor Co., 868 F2d 1226, 1236, 9 USQP2d 1913, 1920 (Fed. Cir. 1989).

It is respectfully submitted that the prior art cited by the Examiner does not set forth the features that the biomaterials have a free orientation without being mobilized as defined in the claim 1.

Specifically, the present invention as recited in claim 1 is directed to a biochip comprising a chip substrate, gel spots mounted and immobilized on the chip substrate, wherein the gel spots have pores therein, and biomaterials entrapped in the pores of the gel spots and encapsulated by the gel spots, and the biomaterials have a free orientation without being immobilized.

That is, the biochip of the present invention is characterized in that (i) the biomaterials are entrapped in pores of the spot to be thereby encapsulated, and (ii) the biomaterials are not immobilized or covalently bound to a gel matrix, whereby the biomaterials have a free orientation. For example, reference is made to the following FIG. 8 of the present application.



By the features of the claimed invention, the biochip according to the present invention exerts the improved reactivity and sensitivity, because a large amount of biomaterials can be contained in the spots while maintaining its 3-dimesional structure. In more detail, see paragraphs [0023] - [0024] of the present specification.

On the other hand, Taylor '576 and Stengel '508 fail to disclose or suggest the claimed features. Specifically, the biomaterials in the cited art are immobilized in gel or coupled with substrate, thus cannot have a free orientation. These references are discussed further below.

(1) As to Taylor '576

It is well known to the ordinary skilled person in the art that where biomaterials are contained in hydrogel, they are immobilized by a covalent bond with a functional group of the hydrogel, as described in the present specification. For example, reference is made to paragraphs [0009] - [0010] of the present specification.

In this regard, Taylor '576 provides a method for preparing an array of gel pads, and sets forth in page 22:5-10 thereof that the below materials, which are well known as hydrogel-formation polymers in the art, are suitable to form a gel.

I. N-ackylacrylamide group, e.g., N-isopropylaerylarnide and N,N-Diethylaerylamide.

II. Independent interpenetrating polymer networks (1PNs) in (which one cross-linked network is intertwined with another, e.g., poly(acryiic acid) and poly(N,NDimethylaciylamide), or poly(ethylene oxide) and poly (N-Acryloylpyprolidine)

Moreover, Taylor '576 discloses in page 20:28-29 thereof that a polynucleotide (an example of a biomaterial) is coupled with a predetermined coupling reagent and also a polynucleotide is covalently bound to the gel polymer.

> *... an array of gel pads which incorporate a polynueleotide covalently bound to the gel polymer.*

In light of the above, Taylor '576 provides the gel pad substantially comprising hydrogel in which biomaterials are coupled with gel material, thereby being immobilized in the gel pad. Therefore, the biomaterials cannot have a free orientation in the gel pad made by the method according to Taylor '576.

(2) As to Stengele '508

Stengele '508 is directed to a method for the specific photolytic deprotection of nucleoside derivatives immobilized on a substrate comprising the following steps:

(a) initial application of a layer of a gel or a viscous liquid on the nucleoside derivatives immobilized on said substrate, with said gel or said viscous liquid comprising specific polymer compounds and at least one element from the group including water, water C1-C4 alcohol mixtures and polar aprotic solvents, and (b) exposure of the nucleoside derivatives for the photolytic separation of the protective groups.

As explained in Stengele '508, when producing DNA chips by photolithographic techniques, a deprotection process is essentially carried out by photolysis, and it results in some disadvantages such as a bad optical resolution, a risk of secondary photolytic reactions, and extension of the exposure time. See paragraphs [0002] - [0004] of Stengele '508.

To address the above-mentioned problems, Stengele '508 provides a method of deprotection of nucleoside derivatives by treatment with a gel or a viscous liquid. In other word, in Stengele '508, the gel is treated for addressing the problems caused by the conventional deprotection process, whereby application of the gel is temporally conducted, and after completion of the deprotection process, the gel is removed from the nucleoside derivatives. See, paragraph [0023] of Stengele '508 as follows:

> *After photolysis, the gel or the viscous liquid is eliminated from the substrate again, which can be achieved in a purely thermal process or else in an appropriate solvent (DMSO, DMF; water) in the case of gels having a comparatively low sol/gel transition temperature.*

The Examiner has indicated that the porous gel is disposed on top of the immobilized oligonucleotides, and thus the biomaterials can be entrapped in the pores therein. However, the gel in Stengele '508 is eliminated from the substrate on which oligonucleotides are immobilized, thus the DNA chip produced by the method of Stengele '508 dose not contain any gel. As a result, biomaterials cannot be entrapped in pores of the gel spot. In contrast, in the biochip according to the present invention, the biomaterials are entrapped in pores of the spot and encapsulated by the spot, as defined in claim 1.

Moreover, biomaterials Stengele '508 are immobilized on the substrate, thus they cannot have a free orientation. In this regard, Stengele '508 discloses that the nucleoside derivatives can be immobilized by covalent bonding on the substrate surface. See paragraph [008] of Stengele '508.

In view of the above remarks, Taylor '576 and Stengele '508 neither suggest nor teach the technical idea of the present biochip wherein the biomaterials have a free orientation without

being immobilized. Thus, the present invention cannot be readily made from Taylor '576 and Stengele '508 by an ordinary person skilled in the art.

Further, the biochip according to the present invention has superior properties in view of the reactivity and sensitivity, as shown in at least page 5 of the present specification and Figure 1. Therefore, the present invention is neither anticipated by nor obvious over Taylor '576 and Stengele '508.

(3) As to Pfeifer '195 and Simon '607

With regard to the Examiner's rejections in view of the second references, Pfeifer '195 and Simon '607, these references also fail to disclose the features of the present biochip. These features were discussed in detail above. Therefore, each of Pfeifer '195 and Simon '607 fail to make up for the deficiencies of the primary references.

In view of the above amendments and remarks, Applicants respectfully submit that independent claim 1 and claims depending therefrom directly or indirectly define the present invention over the references relied on by the Examiner. Therefore, reconsideration and withdrawal of the Examiner's rejections under 35 U.S.C. §§ 102 and 103 are respectfully requested.

New claims

Claims 26-29 have been added in a varying scope. For example, reference is made to pages 6, 8, 9 and Examples of the present specification.

Request for rejoining method claims 9-25

Upon allowance of product claims 1, 2, 5-8 and 26-29, Applicants respectfully request the Examiner to rejoin the method claims 9-25 depending from claim 1 directly or indirectly in the present application.

Conclusion

In view of the above remarks, it is believed that claims are allowable.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Craig A. McRobbie, Reg. No. 42,874 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§ 1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By _____

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Attachment: Excerpt of Wikipedia defining cyclic olefin copolymer (COC)